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Indian Standard

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जैम, जैली और मार्मलेड — विशिष्टि

(दूसरा पुनरीक्षण)

Jam, Jellies and Marmalades — Specification

(Second Revision)

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Fruits, Vegetables, and Allied Products Sectional Committee, FAD 10

FOREWORD

This Indian Standard (*Second Revision*) was adopted by the Bureau of Indian Standards, after the draft finalized by the Fruits, Vegetables and Allied Products Sectional Committee had been approved by the Food and Agriculture Division Council.

Jams, jellies and marmalades are widely consumed. It is, however, necessary to ensure the quality of these products, if the demand is to be maintained and further developed. In order to ensure maintenance of proper quality, it is necessary to have strict quality control based on specifications. It was, therefore, found necessary to formulate an Indian Standard for these products.

This Indian Standard was first published in 1970 and the first revision was brought out in 1993 to update its requirements, taking into consideration the CODEX STAN 79 Codex Standard for Jams (fruit preserves) and Jellies and the European Economic Community (EEC) Directive 79/693/EEC of 24 July 1979 on the approximation of the laws of the Member States relating to fruit jams, jellies and marmalades and chestnut puree. This second revision is being carried out to harmonize the standard with *Food Safety and Standards Act*, 2006 and Regulations framed thereunder. In this revision the following major changes have been made:

a) Use of food additives as per *Food Safety and Standards* (*Food Product Standards and Food Additives) Regulations*, 2011 has been permitted.

b) The limits of heavy metal contaminants has been modified as per *Food Safety and Standards (Contaminants, Toxins and Residues) Regulations*, 2011.

c) The microbiological requirements has been modified as per *Food Safety and Standards* (*Contaminants, Toxins and Residues*) *Regulations*, 2011.

In the formulation of this standard, due consideration has been given to the *Food Safety and Standards (Food Products Standards and Food Additives) Regulations*, 2011 and *Legal Metrology (Packaged Commodities) Rules*, 2011. However, this standard is subject to restrictions imposed under these rules, wherever applicable.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

JAM, JELLIES AND MARMALADES — SPECIFICATION

(Second Revision)

1 SCOPE

This standard prescribes the requirements and methods of sampling and test for jams, jellies and marmalades.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

IS No. / International Standard	*Title*
2860 : 1964	Methods of sampling and test for processed fruits and vegetables
4624 : 1968	Specification for dehydrated peas (*first revision*)
ISO 5522 : 1981	Fruits, vegetables and derived products — Determination of total sulphur dioxide content
5887 (Part 3) : 1999	Methods for detection of bacteria responsible for food poisoning: Part 3 General guidance on methods for the detection of *Salmonella* (*second revision*)
5887 (Part 5) : 1976	Methods for detection of bacteria responsible for food poisoning: Part 5 Isolation, identification and enumeration of *Vibrio cholerae* and *Vibrio parahaemolyticus* (*first revision*)
12014 (Part 1) : 1986	Methods for determination of organic preservatives in foodstuffs: Part 1 Benzoic acid and its salts
12014 (Part 3) : 1986	Methods for determination of organic preservatives in foodstuffs: Part 3 Sorbic acid and its salts
14397 : 1996	Methods for detection, isolation and identification of pathogenic *E. coli* in foods
14988 (Part 1) : 2001	Microbiology of food and feeding stuffs — Horizontal method for detection and enumeration of *Listeria monocytogenes:* Part 1 Detection method
ISO 15213 : 2003	Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of sulfite-reducing bacteria growing under anaerobic conditions

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Jam — Product prepared from a suitable fruit ingredient of one or two or more types which may be:

a) whole fruit, pieces of fruit, fruit pulp or fruit puree;
b) with or without fruit juice or concentrated fruit juice as an optional ingredient;
c) mixed with a nutritive sweetener, with or without water; and
d) processed to a suitable consistency.

3.2 Jelly — Product prepared from a suitable fruit ingredient of one or two or more types of fruit which is:

a) practically free from suspended fruit particles;
b) mixed with a nutritive sweetener, with or without water; and
c) processed to a semi-solid consistency.

3.3 Marmalade — A mixture brought to a suitable gelled consistency of sugars and one or more of the following products obtained from citrus fruit:

a) Pulp,
b) Puree,
c) Juice,

d) Aqueous extracts, and

e) Peel.

3.4 Jelly Marmalade — Product from which all the insoluble solids, or all insoluble solids except for a small proportion of thinly cut peel, have been removed during the process of manufacture.

3.5 Fruit — Fresh, frozen, canned, concentrated or otherwise processed or preserved fruit, free from deterioration containing all its essential constituents and sufficiently ripe for use in the removal of blemishes, topping and tailing, cores, pits and may or may not be peeled.

3.6 Fruit Pulp — The edible portions of the fruit, mashed or cut into pieces, but not reduced to a puree.

3.7 Fruit Puree — Fruit ingredient finely divided by sieving, screening or other mechanical means.

3.8 Fruit Juice — The juice obtained from fruit, fermentable but unfermented, having the characteristic colour, aroma and flavour typical of the juice from the fruit from which it comes.

3.9 Aqueous Extract of Fruit — The aqueous extract of fruit is which (subject to the losses necessarily occurring in proper manufacturing) contains all the water soluble constituents of the fruit used.

3.10 Soluble Solids — Percent by weight of soluble solids as determined by the refractrometric method corrected to 20°C using the International Sucrose Scale but making no correction for insoluble solids or seeds.

3.11 Harmless Extraneous Vegetable Material — Vegetable material common to the specific fruit such as leaves, full caps, stems of over 10 mm in length and sepal, bracts aggregating an area of 5 mm^2 or larger.

3.12 Pit (Stone) — A whole pit or stone in fruits, such as cherries, that are normally pitted; or a piece of pit of approximately one-half pit.

3.13 Pit Fragments — Pieces of pit less than the equivalent of one-half pits, and which weighs at least 5 mg.

3.14 Damaged Fruit — A piece of fruit that is blemished, discoloured or bruised by pathological or other means to the extent that it is materiallly affected.

3.15 Weeping Jellies — Jellies that give out water after cooling due to synerisis.

3.16 Sugar Crystallization — Appearance of sugar crystals in jams, jellies and marmalades.

4 REQUIREMENTS

4.1 General Requirements

Jams and jellies shall be prepared from any fruit ingredient singly or in combination.

4.1.1 *Prepared Fruit Content*

The prepared fruit content in jams, jellies and marmalades shall be not less than 45 percent by mass, except in strawberry, raspberry and ginger jams when the minimum fruit content shall be not less than 25 percent by mass. The minimum fruit content for cashew apples shall be 23 percent and 8 percent for passion fruit. When two or more fruits are used in combination, the mass of each fruit shall be not less than 10 percent of the mass of the combined fruit ingredients. For marmalades, the peel in suspension shall not be less than 5.0 percent.

4.1.2 *Ingredients*

The other substances that may be added to the products are cane sugar, sucrose, dextrose, invert sugar, liquid glucose, honey, sodium, potassium or calcium salts of citric and tartaric acid.

4.1.3 *Pectin*

Pectin derived from any fruit but limited to 1 percent maximum may be used.

4.1.4 *Preservatives*

Sulphur dioxide or any other suitable sulphite may be used. The residual sulphur dioxide (SO_2) content shall not exceed 40 parts per million when tested according to the method prescribed in Annex B of IS 4624 or ISO 5522. Benzoic acid and its sodium and potassium salts or both may also be used, limit shall not exceed 200 ppm when tested by the method prescribed in IS 12014 (Part 1). Sorbic acid and its sodium and potassium salts or both may also be used, limit shall not exceed 500 ppm when tested by the method prescribed in IS 12014 (Part 3).

4.1.5 *Colour*

Permitted natural colours may be used. Permitted synthetic food colours may be used subject to a limit of 100 mg/kg.

4.1.6 *Flavouring Agents*

Natural flavouring, nature identical flavouring and artificial flavouring substances may be used.

4.1.7 *Acidifying Agents*

Citric acid, malic acid, fumaric acid, DL lactic acid and L. tartaric acid may be used. L. tartaric acid if used, shall be as per Good Manufacturing Practices.

4.1.8 *Antioxidants*

Ascorbic acid may be used.

4.1.9 *Antifoaming Agents*

Dimethyl polysiloxane may be used subject to a maximum limit of 10 ppm.

4.2 Requirements of End Products

4.2.1 *Jams*

The finished product shall have gelled consistency. It shall have colour and flavour of original fruit and shall be free from burnt or objectionable flavours, weeping, crystallization, mould growth and shall show no sign of fermentation.

4.2.2 *Jellies and Marmalades*

The finished product shall be reasonably uniform and shall be of good keeping quality and attractive colour. Fruit jellies shall be of gelatinous consistency. It shall be clear, sparkling, transparent, of attractive colour, normal to the type of fruit. It shall not be syrupy, sticky or gummy and should retain the flavour or aroma of original fruit. The product shall be free from burnt or objectionable flavours, weeping, and crystallization. Marmalades shall have a uniform suspension of peel.

4.2.3 *Defects*

The product shall be practically free from extraneous vegetable materials normally associated with the fruits such as peels (excluding marmalades), skin, pits, pit fragments, etc.

4.2.4 *Total Soluble Solids*

The total soluble solids content, when tested according to the method prescribed in Annex A, in the case of jams shall be not less than 68 percent by mass and not less than 65 percent by mass in case of jellies and marmalades.

4.2.5 *Minimum Fill*

Containers shall be filled as commercially practicable. However, the product shall occupy not less than 90 percent of the water capacity of the container when tested in accordance with the method prescribed in Annex B. The water capacity of the container is the volume of distilled water at 20°C which the sealed container will hold when completely filled.

4.2.5.1 When product is packed in glass containers, the water capacity shall be reduced by 20 ml.

4.2.6 Jams, jellies and marmalades shall not contain any metallic contaminants in excess of the quantities specified in Table 1.

4.2.7 *Microbiological Requirements*

The product shall conform to the microbiological requirements prescribed in Table 2.

Table 1 Limit for Metallic Contaminants in Jams, Jellies and Marmalades

(*Clause* 4.2.6 *and* 7)

Sl No.	Characteristic	Requirement	Method of Test, Ref to Cl. No. of IS 2860
(1)	(2)	(3)	(4)
i)	Aresnic (as As), ppm, *Max*	1.1	**13**
ii)	Lead (as pb), ppm, *Max*	2.5	**14**
iii)	Copper (as Cu), ppm, *Max*	30	**15**
iv)	Zinc (as Zn), ppm, *Max*	50.0	**16**
v)	Tin (as Sn), ppm, *Max*	250	**17**

Table 2 Microbiological Requirements for Jams, Jellies and Marmalades

(*Clause* 4.2.7 *and* 7)

Sl No.	Characteristic	Requirement				Method of Test, Ref to IS or Cl. No.
		Sampling Plan[1]		Limit (cfu)		
		N	C	M	M	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(i)	*Salmonella*	5	0	Absent/25g	NA	5887 (Part 3)
(ii)	*Listeria monocytogenes*	5	0	Absent/25g	NA	14988 (Part 1)
(iii)	Sulphite Reducing Clostridia (SRC)	5	0	Absent/25g	NA	ISO 15213
(iv)	*E. Coli* 0157 and Vero or Shiga toxin producing *E. coli*	5	0	Absent/25g	NA	14397
(v)	*Vibrio cholerae*	5	0	Absent/25g	NA	5887 (Part 5)

Note: 1) For sampling plan see Annex C.

4.3 Additional Requirements for ECO-Mark

4.3.1 *General Requirements*

The product shall conform to the requirements prescribed under **4.1** to **4.2.7**.

4.3.2 The manufacturers shall produce to BIS, the consent clearance from the concerned State Pollution Control Board as per the norms laid down under the *Water (Prevention and Control of Pollution) Act*, 1974; *Air (Prevention and Control of Pollution) Act*, 1981; *Water (Prevention and Control of Pollution) Cess Act*, 1977 respectively, along with the authorization, if required, under the *Environment (Protection) Act*, 1986, while applying for ECO-Mark.

4.3.3 The product/packaging may also display in brief the criteria based on which the product has been labelled environment friendly.

4.3.4 The material used for product/packing, shall be recyclable or biodegradable.

4.3.5 The date of manufacture and date of expiry shall be declared on the product/package by the manufacturer.

4.3.6 The product shall be microbiologically safe and shall be free from bacterial and fungal toxins.

4.3.7 The product/package or leaflet accompanying it may display instructions of proper use, storage and transport (including refrigeration temperature compliance) so as to maximize the product performance, safety and minimize wastage.

5 PACKING AND MARKING

5.1 Packing

The product shall be packed either in glass bottles or in hermetically sealed, open top sanitary cans made from tin plates which are inside lacquered or in food grade plastic containers or aseptic packages.

5.2 Marking

5.2.1 Each pack shall be marked or labelled with the following particulars:

a) Name of the product with the brand name, if any;
b) Name and address of the manufacturer;
c) Net quantity of the contents;
d) Date of manufacture;
e) The words 'Best before…….. (month and year to be indicated)';
f) Batch or code number, if any;
g) List of ingredients in descending order;
h) List of additives, if used; and
j) Any other requirement as stipulated under *Food Safety and Standards Act*, 2006 and Regulations framed thereunder and *Legal Metrology Act*, 2009 and Rules framed thereunder.

5.2.2 *BIS Certification Marking*

The product may also be marked with the Standard Mark.

5.2.2.1 The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the standard mark.

5.2.3 *ECO-Mark*

The product may also be marked with the ECO-Mark, the details of which may be obtained from the Bureau of Indian Standards.

6 SAMPLING

The method of drawing representative samples of the material and the criteria for conformity shall be as prescribed in IS 2860.

7 TESTS

Tests shall be carried out as prescribed in Table 1 and Table 2.

ANNEX A

(*Clause* 4.2.4)

DETERMINATION OF TOTAL SOLUBLE SOLIDS

A-1 APPARATUS

A-1.1 Refractometer

Equipped with a sugar scale. The temperature of the refractometer should be controlled to within ± 0.l°C, and for this purpose, it should be provided with a thermostatically controlled water bath and a motor driven pump to circulate water through the instrument. The instrument should be standardized by following the manufacturer's instructions.

A-1.2 Light Source

If the refractometer is equipped with a compensator, a tungsten lamp or a daylight bulb may used. Otherwise, a monochromatic light, such as electric sodium vapour lamp, should be used.

A-2 PROCEDURE

Take representative samples of a well-mixed portion of jam or jelly free from seed and fibre, place on refractometer prisms and read directly at 20°C. If temperature correction is necessary, use the correction factor given in Table 3. It is preferable to have the instrument maintained at constant temperature by circulating water through the prisms. For very accurate results a correction should be made for water insoluble solids as follows:

Percent soluble solids =

$$\text{Percent solids by refractometer} \times \frac{(100 \times a)}{100}$$

where,

a = percent water-insoluble solids.

Table 3 Temperature Corrections for the Standard Model of Sugar Refractometer Calibrated for 20°C

(*Clause* A-2)

Temperature, °C

Temperature, °C	Percentage of Dry Substance													
	5	10	15	20	25	30	35	40	45	50	55	60	65	70
15	0.29	0.31	0.33	0.34	0.34	0.35	0.36	0.37	0.37	0.38	0.39	0.39	0.40	0.40
16	0.24	0.25	0.26	0.27	0.28	0.28	0.29	0.30	0.30	0.30	0.31	0.31	0.32	0.32
17	0.18	0.19	0.20	0.21	0.21	0.21	0.22	0.22	0.23	0.23	0.23	0.23	0.24	0.24
18	0.13	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.16
19	0.06	0.06	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
21	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
22	0.13	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.16
23	0.20	0.21	0.22	0.22	0.23	0.23	0.23	0.23	0.24	0.24	0.24	0.24	0.24	0.24
24	0.27	0.28	0.29	0.30	0.30	0.31	0.31	0.31	0.31	0.31	0.32	0.32	.032	.032
25	0.35	0.36	0.37	0.38	0.38	0.39	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
26	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48
27	0.50	0.52	0.53	0.54	0.55	0.55	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
28	0.57	0.60	0.61	0.63	0.63	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
29	0.66	0.68	0.69	0.71	0.72	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
30	0.74	0.77	0.78	0.79	0.80	0.80	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81

*Up to 19°C subtract from dry substance, above 20°C add to dry substance.

ANNEX B

(*Clause* 4.1.4 *and* 4.2.5)

DETERMINATION OF WATER CAPACITY

B-1 GENERAL

This method applies to metal containers and glass containers.

B-2 PROCEDURE

B-2.1 Metal Containers

B-2.1.1 Select a container which is undamaged in all respects.

B-2.1.2 Wash, dry and-weigh the empty container after cutting out the lid without removing or altering the height of the double seam.

B-2.1.3 Fill the container with distilled water at 20°C to 4.8 mm vertical distance below the top level of the container, and weigh the container thus filled.

B-2.2 Glass Containers

B-2.2.1 Select a container which is undamaged in all respects.

B-2.2.2 Wash, dry and weigh the empty container.

B-2.2.3 Fill the container with distilled water at 20°C to the level of the top thereof, and weigh the container thus filled.

B-3 CALCULATION AND EXPRESSION OF RESULTS

B-3.1 Metal Containers

Subtract the mass found in **B-2.1.2** from the mass found in **B-2.1.3**. The difference shall be considered to be the mass of water required to fill the container, Results are expressed as ml of water, percent.

B-3.2 Glass Containers

Subtract the mass found in **B-2.2.2** from the mass found in **B-2.2.3**. The difference shall be considered to be the mass of water required to fill the container. Results are expressed as ml of water, percent.

ANNEX C

[Table 2]

SAMPLING PLAN FOR MICROBIOLOGICAL REQUIREMENTS

C-1 SAMPLING PLAN FOR MICROBIOLOGICAL REQUIREMENTS

The terms n, c, m and M used in this standard have the following meaning:

n = Number of units comprising a sample.

c = Maximum allowable number of units having microbiological counts above m for 2-class sampling plan and between m and M for 3-class sampling plan.

m = Microbiological limit that separates unsatisfactory from satisfactory in a 2-class sampling plan or acceptable from satisfactory in a 3-class sampling plan.

M = Microbiological limit that separates unsatisfactory from satisfactory in a 3-class sampling plan.

C-2 INTERPRETATION OF RESULTS:

2-Class Sampling Plan (where n, c and m are specified)	3-Class Sampling Plan (where n, c, m and M are specified)
1. Satisfactory, if all the values observed are ≤ m 2. Unsatisfactory, if one or more of the values observed are > m or more than c values are > m	1. Satisfactory, if all the values observed are ≤ m 2. Acceptable, if a maximum of c values are between m and M and the rest of the values are observed as ≤ m 3. Unsatisfactory, if one or more of the values observed are > M or more than c values are > m

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